WHAT IS THE MONTANA DIABETES PROJECT AND HOW CAN WE BE CONTACTED:

The Montana Diabetes Project is funded through a cooperative agreement with the Centers for Disease Control and Prevention, Division of Diabetes Translation (U32CCU815663-0). The mission of the Diabetes Project is to reduce the burden of diabetes and its complications among Montanans. Our web page can be accessed at http://ahec.msu.montana.edu/diabetes/default.htm.

For further information please contact us at:

Project Coordinator:
Todd Harwell, MPH
Phone 406/444-0593
Fax 406/444-7465
e-mail tharwell@state.mt.us

Quality Improvement Coordinator:
Janet McDowall, RN
Phone 406/444-7072
e-mail jmcdowall@state.mt.us

Project Assistants:
Ruth Whitish
Phone 406/444-6677
e-mail rwhitish@state.mt.us

Ellen Bryson
Phone 406/444-7073
e-mail ebryson@state.mt.us

CONTRIBUTORS/ ACKNOWLEDGEMENTS:

The Montana Diabetes Project would like to acknowledge the work of Banik Creative Group, and Northwest Resource Consultants.

MONTANA DIABETES SURVEILLANCE & CLINICAL COMMUNICATION

Montana Department of Public Health and Human Services
Chronic Disease Prevention and Health Promotion Program
Room C317, Cogswell Building
PO Box 202951
Helena, Montana 59620-2951

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ISSUE: JANUARY - MARCH 2000

PREVALENCE OF CARDIOVASCULAR DISEASE AND RELATED RISK FACTORS IN AMERICAN INDIAN AND NON-INDIAN ADULTS IN MONTANA, 1999.

WHAT'S INSIDE

Background:

Cardiovascular diseases (CVD) including both heart disease and stroke are the leading causes of death in the United States in all ethnic and racial groups.[1] In Montana, the CDC estimated that cardiovascular disease contributed to 37% of the deaths in 1994.[2] In the same report the costs of medical care and the lost productivity from work due to cardiovascular disease were estimated to be $500 for each person in Montana.

Although mortality from coronary heart disease has decreased in the US in recent decades[1], there is a growing concern that this trend may be blunted as the rate of diabetes increase.[3] Diabetes is an independent risk factor for coronary heart disease in epidemiologic studies and several biologic mechanisms have been proposed to explain how hyperglycemia aggravates atherosclerosis. Indeed, American Indian communities are experiencing higher mortality rates for CVD. This "Rising Tide of Cardiovascular Disease in American Indians" has been attributed in large part to the high rates of diabetes in this population.[4]

Total cardiovascular disease death rates in Montana in recent years were slightly lower than rates in the US.[5] On closer examination of the data for Montana in 1995, the CVD death rate was 220.7 per 100,000 for whites and 255.9 for "other." According to Indian Health Service data, northern Plains Indians have relatively high rates of cardiovascular morbidity and mortality, but few studies have compared the rates of CVD and risk

factors for both American Indians and non-Indian simultaneously.[6]

To compare rates of CVD and the prevalence of risk factors for CVD in Montana's population in 1999, the Montana Department of Public Health and Human Services (Montana DPHHS) conducted a special telephone survey of American Indians living on or near the seven reservations and compared the responses from this survey to data for adult non-Indians included in the 1999 Behavioral Risk Factor Surveillance System (BRFSS). This report summarizes the self-reported prevalence of CVD and risk factors from these surveys and compares the two populations.

Methods:

The Montana DPHHS completed a special BRFSS telephone survey of American Indians living on or near the seven reservations in Montana in May through July of 1999. Trained interviewers made telephone calls to a random sample of households with three-digit telephone prefixes, located on or near the seven reservations in Montana. The number of completed telephone calls was proportional to the number of American Indians living on each reservation (based on the 1990 Census). Persons ≥18 years of age and who reported being American Indian were eligible to participate in the survey. A total of 1,000 surveys of American Indian adults was completed. The Montana DPHHS also conducts a yearly BRFSS telephone survey of a random sample of adult Montanans ≥18 years of age. A total of 905 surveys were completed from January through July 1999 among non- Indian Montanans. The non-response rate (refusal, eligible respondent not available, unable to communicate due to physical/mental impairment, or language barrier) for the American Indian and annual BRFSS surveys were 2.1% and 7.8%, respectively.

Both surveys included the same questions regarding demographics, chronic diseases, current use of tobacco and the respondents' current height and weight. The demographic questions included age, sex, and race/ethnicity. Respondents were asked if they ever had a myocardial infarct (MI) or heart attack, angina or stroke. Respondents who reported any of these conditions were categorized as having cardiovascular disease (CVD). Respondents were asked if they had ever been told by a physician that they had hypertension/high blood pressure, high cholesterol or diabetes. Female respondents who had only been told they had gestational diabetes were not categorized as persons with currently diagnosed diabetes. Respondents who reported that they smoked cigarettes everyday or some days were categorized as current smokers. Height and weight were used to calculate a body mass index (BMI, kg/m^2). Individuals with a BMI value greater than or equal to 27.0 were defined as overweight.

Crude prevalence estimates of CVD and related risk factors were calculated. Pearson Chi-square and Fisher exact tests were used to compare the proportion of American Indian and non-Indian respondents with CVD, other chronic diseases, BMIs and current smoking. Logistic regression analyses were used to identify variables independently associated with CVD among American Indian and non-Indian respondents. Odds ratios (OR) and ninety-five percent confidence intervals (95% CI) were calculated.

Characteristics of American Indian and non-Indian respondents:

The mean age of American Indian respondents was significantly lower (mean 42.4, SD 15.4) compared to non-Indian respondents (mean 50.0, SD 17.8, $p<0.001$). There were no differences by sex among American Indian (female 57%) and non-Indian respondents (female 57%, $p=0.95$). Table 1 displays the age and sex distributions among respondents stratified by age (<45 years vs. ≥45 years). There were no differences in the mean age or sex distributions among American Indian and non-Indian respondents less than 45 years of age. Among respondents ≥45 years of age, American Indian respondents were more likely to be younger as compared to non-Indian respondents. There were no significant differences by sex among respondents ≥45 years of age.

risk factors (hypertension, high cholesterol, overweight). Additionally, the pattern of CVD risk factors tended to be somewhat different in the two populations.

Although risk factors for CVD in the American Indian population may differ somewhat from the pattern in the non-Indian population, cardiovascular disease prevention programs are urgently needed for all Montanans, particularly those with diabetes. CVD prevention activities will need to target the risk factors of most significance to particular sub-populations.

Reported by:

D Gohdes, TS Harwell, SD Helgerson, JM McDowall, *K Moore, JG Smilie; Montana DPHHS, *Billings Area Indian Health Service.

Acknowledgements:

We would like to thank Linda Priest and the staff at Northwest Resource Consultants for their expertise and work on the American Indian and the BRFSS surveys.

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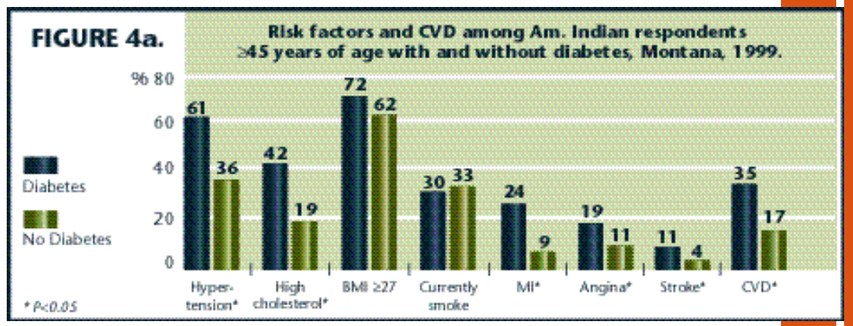
UPCOMING EVENTS:

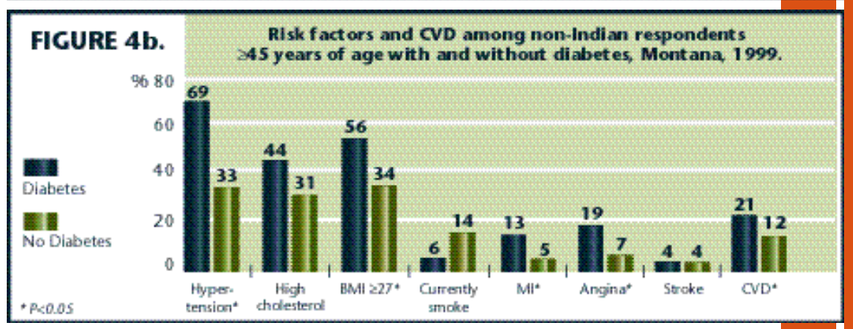
Annual patient and health care professional conference, May 19-20, 2000, Billings. The Montana Diabetes Project, Montana ADA, MAADE, University of Montana, School of Pharmacy and others are sponsoring the annual patient and professional conference in Billings. The conference will include national experts on diabetes and provide up-to-date information on diabetes care. The health professional conference will be on both Friday and Saturday, May 19th and 20th. The one-day patient and family member conference is on Saturday, May 20th. For more information, please call Ruth Whitish at 406/444-6677.

Diabetes education basic skills workshop, October 13-14, 2000, Helena.
The Montana Chapter of the American Association of Diabetes Educators (MAADE) and the Montana Diabetes Project are co-sponsoring a two-day conference for health care professionals. For more information please contact Ellen Bryson at 406/444-7073.

RECENT LITERATURE ON DIABETES:

1. Tamada JA, Garg S, Jovanic L, Pitzer KR, Fermi S, Potts RO, and the Cygnus Research Team. Noninvasive glucose monitoring: Comprehensive clinical results. JAMA 1999; 282 (19): 1839-44.
2. Ritz E. Orth SR. Nephropathy in patients with type 2 diabetes. New Eng J Med 1999; 341 (15): 1127-33.
3. Ferris III FL, Davis MD, Aiello LM. Treatment of diabetic retinopathy. New Eng J Med 1999; 341 (9): 667-77.





more likely to report hypertension, high cholesterol, MI, angina, stroke, CVD and overweight as compared to those without diabetes. Figure 4b displays the prevalence of risk factors and CVD among non-Indian respondents ≥45 years of age with and without diabetes. Respondents with diabetes were more likely to report hypertension, MI, angina and overweight as compared to those without diabetes.

Limitations:

There are a number of limitations to these analyses. First, the survey was conducted by telephone and does not reflect the experience of individuals in Montana homes without telephones. However, over 75% of Montana American Indian households do have telephones.[7] This availability to telephones is consistent to that for non-Indians in Montana and is comparable to the most recent national estimate (77%) for American Indian, Eskimo or Aleut households in the United States.[8] Second, self-reported data were used in these analyses. Previous studies, however, have found that self-reported diagnoses and risk factors such as diabetes, hypertension, and cigarette smoking are reliably reported.[9, 10] Our estimates for BMI may be low. Previous studies have found that weight tends to be under-reported.[10-12]

Conclusions:

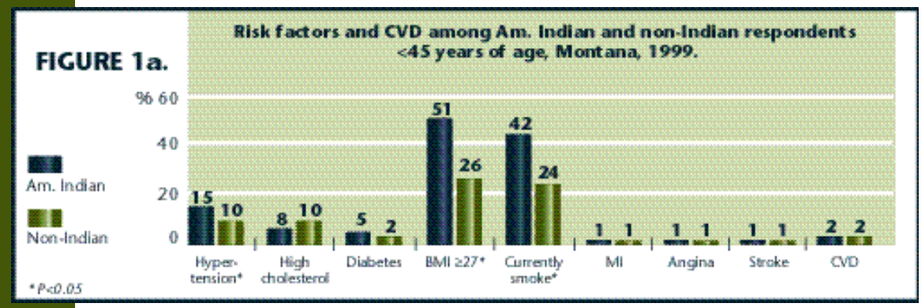
CVD is a serious threat to the health of adults in Montana. Among respondents ≥45 years of age, 21% of American Indians and 13% of non-Indians have experienced a stroke, MI or angina. These data indicate that a significant percentage of Montanans under the age of 45 are at risk for CVD. Among respondents <45 years of age, over 20% of non-Indians and over 40% of Indians reported current smoking.

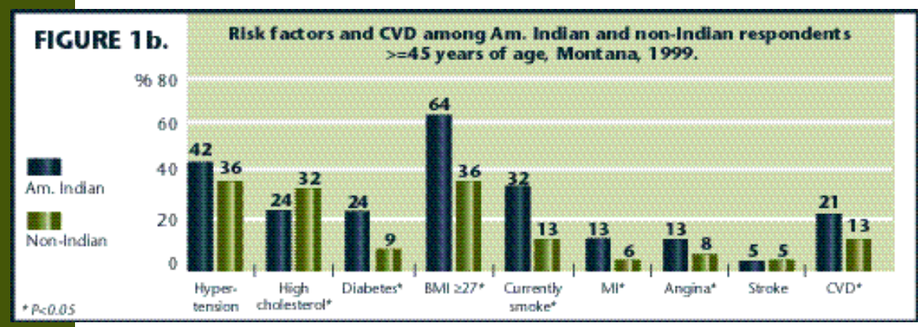
The association between diabetes and CVD is strong. Both American Indian and non-Indian respondents ≥45 years of age with diabetes were more likely to report CVD (MI, angina and stroke). Individuals with diabetes were also more likely to report other CVD

TABLE 1. Characteristics of American Indian and non-Indian respondents by age, Montana, 1999.

	<45 years old		≥45 years old	
Characteristics	American Indian (N=598)	Non-Indian (N=375)	American Indian (N=401)	Non-Indian (N=529)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Age (years)	32.0 (7.8)	33.2 (7.7)	58.1 (10.0)	62.0 (12.5)*
	#(%)	#(%)	#(%)	#(%)
Sex				
Male	252 (42)	166 (44)	176 (44)	220 (42)
Female	346 (58)	209 (56)	225 (56)	309 (58)

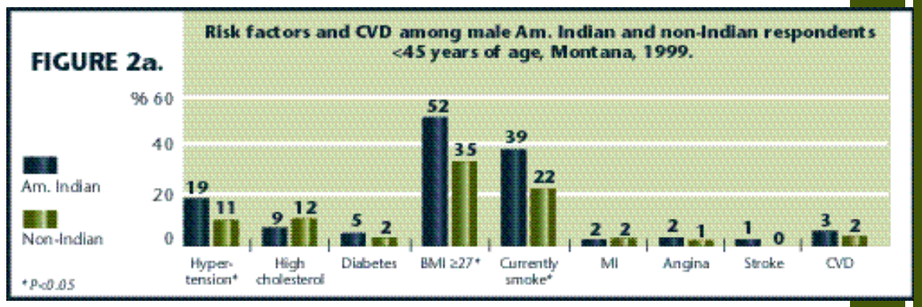
*P<0.05

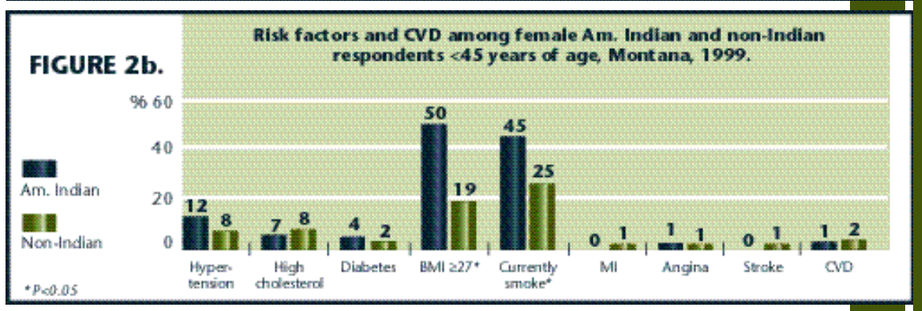


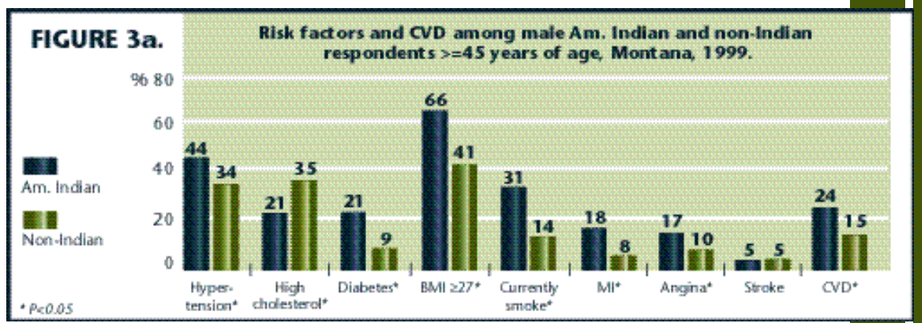


Prevalence of CVD and risk factors among American Indian and non-Indian respondents by age:

The prevalence of hypertension, overweight, and current smoking was significantly higher among American Indians as compared to non-Indian respondents less than 45 years of age. (Figure 1a.) No significant differences were found between American Indian and non-Indian respondents less than 45 years of age for high cholesterol status, diabetes, MI, angina, stroke, or CVD. Among respondents ≥45 years of age, non-Indians reported a higher prevalence of elevated cholesterol but lower prevalence of diabetes, current smoking, overweight, MI, angina and CVD as compared to American Indians. (Figure 1b.)







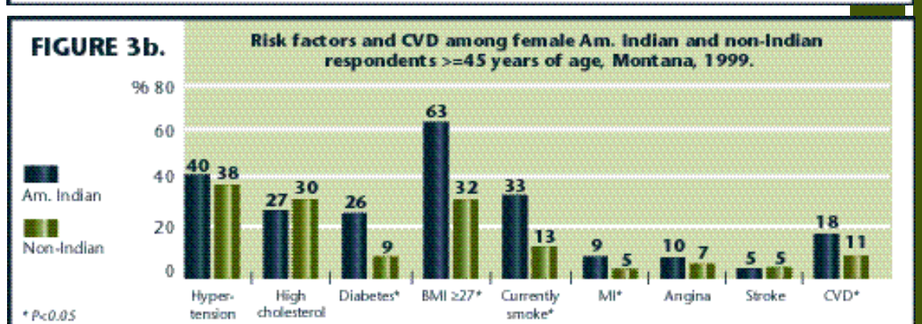


TABLE 2. Factors associated with cardiovascular disease among American Indians and non-Indians, Montana, 1999.

	American Indians	Non-Indians
	(N=1000)	(N=905)
Factor	OR (95% CI)+	OR (95% CI)
Age ≥45 years	9.0 (4.4-18.1)	7.3 (2.8-19.0)
Sex (male)	1.6 (1.0-2.6)	1.5 (0.9-2.6)
Hypertension	2.7 (1.6-4.6)	3.3 (1.9-5.8)
High cholesterol	2.5 (1.4-4.3)	1.3 (0.8-2.3)
Diabetes	2.1 (1.2-3.8)	1.5 (0.7-3.2)
Currently smoke	0.5 (0.3-0.8)	1.9 (1.0-3.6)

+Odds ratio (ninety-five percent confidence interval)

Prevalence of CVD and risk factors among male and female respondents by age:

Male American Indian respondents less than 45 years of age reported a higher prevalence of hypertension, overweight and current smoking as compared to male non-Indian respondents less than 45 years of age. (Figure 2a.) No significant differences were found for male American Indian and non-Indian respondents less than 45 years of age for cholesterol status, diabetes, MI, angina, stroke or CVD. Female American Indian respondents less than 45 years old were more likely to be overweight and currently smoke cigarettes as compared to female non-Indian respondents less than 45 years of age. (Figure 2b.) No significant differences were found for female American Indian and non-Indian respondents less than 45 years of age for hypertension, cholesterol status, diabetes, MI, angina, stroke or CVD.

Male American Indians ≥45 years of age had a significantly higher prevalence of hypertension, diabetes, overweight, current smoking, MI, angina and CVD as compared to non-Indian males. (Ffigure 3a.) Non-Indian males ≥45 years of age had a higher prevalence of high cholesterol as compared to American Indian males. Female American Indians ≥45 years of age had a significantly higher prevalence of diabetes, overweight, current smoking, MI, and CVD as compared to non-Indian females. (Figure 3b.) No significant differences were found between these groups for hypertension, high cholesterol, angina or stroke.

Factors associated with CVD among American Indian and non-Indian respondents:

Multiple factors were independently associated with CVD among American Indians. (Table 2.) These factors included age (≥45 years), hypertension, high cholesterol and diabetes. Among non-Indian respondents, two factors were independently associated with CVD: age (≥45 years) and hypertension.

CVD and risk factors among American Indian and non-Indian respondents ≥45 years of age with diabetes as compared to those without diabetes:

Figure 4a displays the prevalence of risk factors and CVD among American Indian respondents ≥45 years of age with and without diabetes. Respondents with diabetes were